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MEMORANDUM

DATE: 2 December 1998

TO: David Bennett, WAM, U.S. EPA, Region X

FROM: Michelle Turner, Chemist, WESTON, Seattle
RM Roger McGinnis, Senior Environmental Chemist, WESTON, Seattle

SUBJECT: Validation of Polychlorinated Biphenyls (Aroclor) Data
Laboratory Batch: K9805481
Site: Duwamish River

WORK ASSIGNMENT NO. 46-23-0JZZ

WORK ORDER NO. 4000-019-038-5200-00

DOC. CONTROL NO. 4000-019-038-AAAK

cc. Bruce Woods, RAP-WAM, U.S. EPA, Region X
Dena Hughes, Site Manager, WESTON, Seattle (memo only)
Kevin Mundell-Jackson, Database Management, WESTON, Seattle

The quality assurance review of twenty sediment samples, laboratory batch K9805481, collected from the Duwamish River has been completed. Samples were analyzed for polychlorinated biphenyls as Aroclors using EPA Method 8082 by Columbia Analytical Services of Kelso, Washington. The samples were numbered:

98334037	98334038	98334039	98334040	98334041
98334042	98334043	98334044	98334045	98334046
98334047	98334048	98334049	98334050	98334051
98334052	98334053	98334054	98334055	98334056

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DCN 4000-019-038-AAAK

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Region X





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Data Qualifications

The following comments refer to the laboratory performance in meeting the quality control criteria described in the technical specifications of the laboratory subcontract. The review follows the format described in the *National Functional Guidelines for Organic Data Review* (EPA OSWER Directive 9240.1-05, February 1994).

1. Timeliness

All samples met holding time criteria of 14 days for sample extraction and 40 additional days for extract analysis.

2. Initial Calibration

a) Mixed Aroclor 1016/1260 Standard

A six point initial calibration was performed. Calibration factors were calculated for a minimum of five peaks, none of which are common to both Aroclors. The calibration factor percent relative standard deviation (%RSD) was less than 20 percent for all peaks used for quantitation.

b) Individual Aroclor Standards

Calibration factors were calculated from a mid-range standard for the other 5 Aroclors using 3 to 5 peaks.

3. Calibration Verification

Aroclor 1016/1260 calibration verification standards were analyzed every 12 hours using a midrange standard. The calibration factor percent difference was less than 25 percent of the initial calibration value.

4. Retention Time Windows

Retention Time Windows were calculated from initial calibration. Retention times for calibration verification standards were within established windows.

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5. Detection Limits

Instrument detection limits met project required quantitation limits

6. Blanks

a) Laboratory Method Blanks

Laboratory method blank frequency criteria were met.

No target analytes were reported in laboratory method blanks.

b) Field Blanks

No field blanks were associated with this laboratory batch

7 System Monitoring Compounds (Surrogates)

Surrogate compound percent recovery met quality control criteria for all samples except:

Sample	Surrogate Compound	Percent Recovery	QC Limits
KWG9802733-7 Method Blank	Hexabromobiphenyl	<1	30-150

Surrogate recoveries for all associated samples were within QC limits. The case narrative indicates that, as sample surrogate recoveries were acceptable, the low recovery in the method blank is an isolated incident. Method blank results from prior analysis dates indicate that the system is in control. No qualifiers were assigned to samples in this SDG based on method blank surrogate results.

8. Matrix Spike and Matrix Spike Duplicate

All matrix spike (MS) met QC guidelines. Matrix spike duplicate (MSD) results were not provided. The case narrative indicated that spike solution was not added to the MSD. No qualifiers were assigned solely on MS results.

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9 Laboratory Control Sample (LCS) Analysis

LCS recovery goals for Aroclors were established in the project Sampling and Analysis Plan at 70 to 130% for sediment. Based on conversations with the laboratory, historical control chart limits of 26 – 142 for Aroclor 1016 and 40-139 for Aroclor 1260 were also used for data qualification

All LCS percent recoveries met QC guidelines (P-project, L-laboratory) except for the following compounds.

Sample	Compound	Percent Recovery	QC Limits
KWG9802733-5	Aroclor 1016	42	70-130 (P) 26-142 (L)
KWG9802733-5	Aroclor 1260	61	70-130 (P) 40-139 (L)

Results for compounds listed above were qualified as estimated (J).

10. Field Duplicate Analysis

Samples 98334038 and 98334039 were field duplicates. The relative percent difference between duplicate results was within limits of 35 percent RPD for all analytes where concentrations were greater than 5 times the reporting limit.

11 Second Column Confirmation

The relative percent difference (RPD) in reported analyte concentration was greater than 35 percent for the primary and confirmation column for the following samples



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Sample Number	Compound	DB-5 Conc (µg/Kg)	DB-608 Conc (µg/Kg)	RPD
98334038	Aroclor 1254	57 3	95 4	50
98334040	Aroclor 1260	22 3	42 1	62
98334048	Aroclor 1254	37 5	67 4	57
98334050	Aroclor 1254	97 5	167	53

Differences can arise from analytical interferences on one column. However, the relative percent differences are not deemed significant at the reported concentrations. The lower concentration was reported for each analyte

12 Sample Analysis

A cursory review of raw data was performed. All laboratory deliverables were present and complete. A duplicate analysis was performed for this SDG. All RPD results were less than 15 percent. The case narrative indicated that the method blank extracted on 8/22/98 had a surrogate recovery of less than 1 percent. All other surrogates associated with this batch had good recoveries so no reextraction was performed. A method blank from 8/20/98 was provided with the sample results and demonstrates that the system is in control. Additionally, the matrix spike duplicate had no spike solution added to it. As the LCS and MS were acceptable, no additional action was taken. No unusual problems were noted.

13 Laboratory Contact

No laboratory contact was required.

Data Assessment

Upon consideration of the data qualifications noted above, the data are ACCEPTABLE for use except where flagged with data qualifiers that modify the usefulness of the individual values

Data Qualifiers

U - The compound was analyzed for, but was not detected.

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- UJ - The compound was analyzed for, but was not detected. The associated quantitation limit is an estimate because quality control criteria were not met.
- J - The analyte was positively identified, but the associated numerical value is an estimated quantity because quality control criteria were not met or because concentrations reported are less than CRDL or lowest calibration standard.
- R - Quality control indicates that data are unusable (compound may or may not be present). Resampling and reanalysis are necessary for verification.
- N - Presumptive evidence of presence of material (tentative identification).
- I - Elevated reporting limit due to matrix interference.

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334037 Units ug/Kg (ppb)
Lab Code K9805481-001 Basis Dry
Test Notes

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	2005
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/29/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/29/98	57	48
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/29/98	44	J

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Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment


Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334038 **Units** ug/Kg (ppb)
Lab Code K9805481-002 **Basis** Dry
Test Notes

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	20 uJ
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/29/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/29/98	57	J
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/29/98	40	J

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Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334039 **Units** ug/Kg (ppb)
Lab Code K9805481-003 **Basis** Dry
Test Notes

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	LOW
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/29/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/29/98	39	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/29/98	31	

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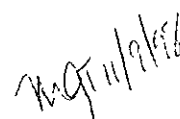


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Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334040 **Units** ug/Kg (ppb)
Lab Code K9805481-004 **Basis:** Dry
Test Notes

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	20UJ
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/29/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/29/98	35	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/29/98	22	J

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Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334041 Units ug/Kg (ppb)
Lab Code K9805481-005 Basis Dry
Test Notes

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	LOW
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/29/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/29/98	64	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/29/98	65	J

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Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

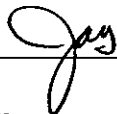
Polychlorinated Biphenyls (PCBs)

Sample Name 98334042
Lab Code K9805481-006
Test Notes

Units ug/Kg (ppb)
Basis Dry

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	2015
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/29/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/29/98	43	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/29/98	63	J

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334043 **Units** ug/Kg (ppb)
Lab Code K9805481-007 **Basis** Dry
Test Notes

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	20 ug
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/29/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/29/98	60	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/29/98	35	J

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334044 Units ug/Kg (ppb)
Lab Code K9805481-008 Basis Dry
Test Notes

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	2005
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/29/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/29/98	56	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/29/98	52	J

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name: 98334045
Lab Code: K9805481-009
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	20 uJ
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/29/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/29/98	99	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/29/98	40	J

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Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334046
Lab Code K9805481-010
Test Notes

Units ug/Kg (ppb)
Basis Dry

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	2005
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/29/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/29/98	180	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/29/98	80	J

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mg/100g

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334047 **Units** ug/Kg (ppb)
Lab Code K9805481-011 **Basis** Dry
Test Notes

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	20 UJ
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/29/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/29/98	74	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/29/98	46	J

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Date

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334048 **Units** ug/Kg (ppb)
Lab Code K9805481-012 **Basis** Dry
Test Notes

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	20 ug
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/29/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/29/98	38	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/29/98	41	J

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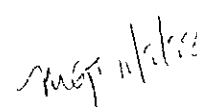


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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334049 **Units** ug/Kg (ppb)
Lab Code K9805481-013 **Basis** Dry
Test Notes

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	2065
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/29/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/29/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/29/98	51	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/29/98	41	J

Approved By



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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

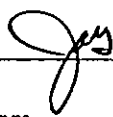
Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334050 **Units** ug/Kg (ppb)
Lab Code K9805481-014 **Basis** Dry
Test Notes

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	20UJ
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/30/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/30/98	98	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/30/98	83	J

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334051 **Units.** ug/Kg (ppb)
Lab Code K9805481-015 **Basis** Dry
Test Notes

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	20 UJ
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/30/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/30/98	35	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/30/98	30	J

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

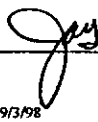
Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334052 **Units** ug/Kg (ppb)
Lab Code K9805481-016 **Basis** Dry
Test Notes

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	2015
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/30/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/30/98	28	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/30/98	23	J

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334053
Lab Code K9805481-017
Test Notes

Units ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	2005
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/30/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/30/98	65	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/30/98	53	J

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

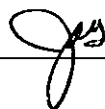
Polychlorinated Biphenyls (PCBs)

Sample Name 98334054
Lab Code K9805481-018
Test Notes

Units ug/Kg (ppb)
Basis Dry

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	20 ug
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/30/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/30/98	60	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/30/98	42	J

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334055 **Units** ug/Kg (ppb)
Lab Code K9805481-019 **Basis** Dry
Test Notes

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	20 ug
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/30/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/30/98	28	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/30/98	28	J

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805481
Date Collected: 8/13/98
Date Received: 8/14/98

Polychlorinated Biphenyls (PCBs)

Sample Name 98334056 Units ug/Kg (ppb)
Lab Code K9805481-020 Basis Dry
Test Notes

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	2015
Aroclor 1221	EPA 3550B	8082	40	1	8/22/98	8/30/98	ND	
Aroclor 1232	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1242	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1248	EPA 3550B	8082	20	1	8/22/98	8/30/98	ND	
Aroclor 1254	EPA 3550B	8082	20	1	8/22/98	8/30/98	36	
Aroclor 1260	EPA 3550B	8082	20	1	8/22/98	8/30/98	28	J

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